



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,564	10/27/2003	Hiromi Katoh	4539-0110P	3603
2292	7590	06/30/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			VU, PHU	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/693,564	KATOH ET AL	
	Examiner	Art Unit	
	Phu Vu	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 15-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claim 1-15 drawn to an optical shifter classified in class 349, subclass 202.
- II. Claims 21-23 drawn to multicolor projector, classified in class 349, subclass 202.
- III. Claim 16-20 drawn to driving method for an liquid crystal, classified in class 349, subclass 87.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case the optical shifter can be used in scanner.

Inventions I and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product as claimed can be used in a materially different process using that product. Claims 16-20 refer to a specific states in

driving such as going from an A->B->C->A transition however they can be driving such that the states don't follow a repeating cycle.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Robert Downs on 6/24/05 a provisional election was made with traverse to prosecute the invention of I, claims 1-15. Affirmation of this election must be made by applicant in replying to this Office action. Claim 16-23 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 3 is rejected under 35 U.S.C. 102(b) as being anticipated by Okamura et al. US Patent No. 6061103.

Regarding claims 3, Okamura teaches an optical shifter comprising a first optical shifting section and a second optical shifting section, each of which is able to transmit an incoming light ray after having shifted the optical axis thereof, the first and second optical shifting sections being arranged such that a light ray that has been transmitted through the first optical shifting section enters the second optical shifting section, wherein each of the first and second optical shifting section includes: a liquid crystal element including a liquid crystal cell (fig. 30 element 73 and 75), the liquid crystal cell selectively changing the polarization direction of the incoming light ray in response to a voltage applied to thereto; and a birefringent element (fig. 30 elements 74 and 76) which, receives the light ray that has been transmitted through the liquid crystal element and which exhibits one of the multiple different refractive indices according to the polarization direction of the incoming light ray. Okumura also teaches the magnitude of the shift caused by the first optical shifting section between the optical axes of the incoming and outgoing light rays thereof is substantially equal to that of shift caused by the second optical axes of the incoming and wherein the optic axis of the birefringent element included in the first optical shifting section is parallel to that of the birefringent element included in the second optical shifting section.

Regarding claim 7, the reference teaches the optical axis of the outgoing light ray of the second optical shifting section is defined by one of the first, second and third positions according to a combination of voltages to be applied to the liquid crystal elements of the first and second shifting section the second position having been shifted by d (first

liquid crystal plate on second off) from the optical axis of the incoming light ray of the first optical shifting section, the third position having been shifted by $2d$ (see fig. 30 both plates on) from the optical axis of the incoming light ray of the first optical shifting section.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 –2, 4-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamura et al. US Patent No. 6061103.

Regarding claims 1 and 4, Okamura teaches an optical shifter comprising a first optical shifting section and a second optical shifting section, each of which is able to transmit an incoming light ray after having shifted the optical axis thereof, the first and second optical shifting sections being arranged such that a light ray that has been transmitted through the first optical shifting section enters the second optical shifting section, wherein each of the first and second optical shifting section includes: a liquid crystal element including a liquid crystal cell (fig. 30 element 73 and 75), the liquid crystal cell selectively changing the polarization direction of the incoming light ray in response to a voltage applied to thereto; and a birefringent element (fig. 30 elements 74 and 76) which, receives the light ray that has been transmitted through the liquid crystal element and which exhibits one of the multiple different refractive indices according to the polarization direction of the incoming light ray. Okamura does not explicitly teach the magnitude of the

shift caused by the first optical shifting section between the optical axes of the incoming and outgoing light rays thereof is substantially twice greater than of shift caused by the second optical shifting section between the optical axes of the incoming and outgoing light rays thereof. However, applicant admits that the magnitude of the shift is proportional to the thickness t (see applicant specification US 2004/0085486 [0111]), and element 10'a is twice as thick as the second optical shifting section 10'b (see [0122]) applicant only uses the thickness to determine the relative amount of shifting between the two sections.

However, the reference also teaches that the amount of thickness determines the shift amount (see column 6 lines 27-31). Therefore applicant's modification of having the magnitude of the first shift twice the magnitude of the second shift is considered obvious over Okumura's teaching of the magnitude of the shift being modified by a variation in the width since applicant uses a variation in width to vary the shift amounts as well. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use modify the width to achieve any ratio between the shifts.

Regarding claim 2, the reference teaches the optical axis of the birefringent element included in the second optical shifting section (see fig. 30 elements 74 and 76).

Regarding claim 5, the limitation of the magnitude of the shift caused by the first optical shifting section between the optical axes of the incoming and outgoing light rays thereof is substantially twice greater than the shift caused by the second optical shifting section between the optical section is obvious over Okumura's teaching of the magnitude of the shift being modified by a variation in the width since applicant uses a variation in width to vary the shift amounts as well.

Regarding claims 6, 8-10, the limitation "wherein the optical axis of the outgoing light ray of the second optical shifting is defined by one of first, second, and third positions according to a combination of voltages applied to the liquid crystal elements of the first and second optical shifting sections, the first aligned with the optical axis the second been shifted by d and the third been shifted by $2*d$ is met by an optical shifter having two sections with the magnitude of shift caused by the first optical shifting section twice greater than that of shift caused by the second optical shifting section and a liquid crystal cell selectively changing the polarization direction of the incoming light ray in response to a voltage applied thereto. Consider an optical shifter as in fig. 30 with element 74 having a shift amount twice that of element 76. Turning element 73 on while leaving element 75 off would result in the output shifted by $2 * d$ and turning element 75 off while leaving element 74 off would result in a shift of d and both polarization elements off would result in a the output aligned with the optical axis of the incoming light ray. The limitation of a fourth position with $3*d$ shift would require both polarization elements to be on.

Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamura in view of Fergason et al. US Patent No. 5715029 and further in view of Tarumi et al. US Publication No. 2002/0047105.

Regarding claims 11 and 12, Okamura discloses all the limitations of claims 11 and 12 except the liquid crystal cell is a TN mode and the liquid crystal cell exhibiting positive dielectric anisotropy. The limitation of the quartz plate being a made of uniaxial crystals is met because the plate exhibits one axis (see fig. 30 elements 74 and 76). However, Fergason teaches an optical shifter that uses a conventional twisted nematic

LCD with a quartz crystal. Tarumi teaches that most display quality twisted nematic liquid crystal panels use positive dielectric liquid crystal therefore use of positive dielectric anisotropic liquid crystal also is considered conventional. Conventionality has associated benefits such as lower production costs, maturely developed or perfected implementations, and ready availability. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a twisted nematic liquid crystal with positive dielectric anisotropy to gain benefits of conventionality such as lower production costs, maturely developed implementations and ready availability.

Regarding claims 13-15, Okamura discloses the quartz plate being a made of uniaxial crystals is met because the plate exhibits one axis (see fig. 30 elements 74 and 76) and the limitation of the of the directors cross each other at right angles on a pair of planes of the first and second liquid crystal cells is also met by the primary reference because Okamura discloses the liquid crystal rotates incident light by 90 degrees in the off state therefore the liquid crystals are considered to have directors that make a 90 degree angle when crossed. Okamura fails to disclose a TN mode and the liquid crystal cell exhibiting positive dielectric anisotropy and having opposite optical. However, Fergason teaches an optical shifter that uses a conventional twisted nematic LCD with a quartz crystal. Tarumi teaches that most display quality twisted nematic liquid crystal panels use positive dielectric liquid crystal therefore use of positive dielectric anisotropic liquid crystal also is considered conventional. Conventionality has associated benefits such as lower production costs, maturely developed or perfected implementations, and ready availability. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill

Art Unit: 2871

in the art to use a twisted nematic liquid crystal with positive dielectric anisotropy to gain benefits of conventionality such as lower production costs, maturely developed implementations and ready availability.

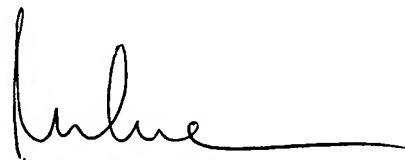
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571)-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu
Examiner
AU 2871



DUNG T. NGUYEN
PRIMARY EXAMINER